The Screen-Grid Booster

Success and Otherwise

AN Auckland reader having made inquiries regarding the construction of the booster, writes as follows:

"Without waiting for a reply to my last queries re booster attaching to five-valve, I am enclosing further queries, as I have made booster, and will state results. My friend also made one, and has attached it to a four-valve circuit he built himself, similar to a Browning-Drake, and gee! it has proved beyond expectations. He never had the Japs. or Americans before, and now he has had two of each on loudspeaker, and the small stations in Aussie he now hears on speaker. Well, you have to hear it to believe it, and three degrees will tune them out. I came straight home and started mine."

Our correspondent then proceeds to state that so far his booster has not functioned when connected to his factory-built receiver. Unfortunately, some constructors have bad luck or adverse circumstances of some kind. It appears to be inevitable with any circuit that is published. In the majority of cases the trouble may be caused by a "resin" soldered joint or some equally simple matter, bad contact on valve legs, coils, etc. Then there is the valve itself. This should always be carefully tested for contact between plate and screen and screen and control grid in the case of the 222.

Some constructors, of course, make considerable alterations in the lay-out, components, etc., and where the screen-grid valve is concerned, this is certainly risky.

As a rule it is wise to place a 2 mfd. condenser across the B battery, and also across the detector voltage, in order to minimise any chance of feedback through the battery, which the H.F. choke is also used to prevent.

About Variable Condensers

FROM the early semi-circular form of the plates in variable condensers the shape has gradually evolved in four distinct stages, the straight-line frequency being the third. In this pattern the plates are made long and thin, the object being to space the stations more widely apart on the dial and avoid the crowding of most stations into a small portion of the dial, as was the case in the earlier types. At the lower end of the scale there is very small capacity increase that this type proves very susceptible to outside capacities, which thus tend to disturb the calibration line. This, however, is not a great objection, especially where there are few stations on the lower wave-lengths, except when condensers are to be worked in gangs.

A fourth type, the logarithmic midline, is now in extensive use as being the happy medium between the straight line frequency, and the straight line frequency wave-length types. With this type it is possible to set several condensers to read the same on any one wave-length, and they will then give identical readings all round the dials, so that working in gangs is greatly simplified, enabling two or three condensers to be operated with one control.

Primary Importance of Impedance

There can be no doubt, in the mind of a technical reader, that the fundamental constant of a valve, which indicates its suitability for any particular purpose, is its impedance, since this must in all cases be suited to the properties of the components in the anode circuit of the valve. Provided that a valve has an impedance suitable for the conditions under which it has to work, it may be regarded as correctly chosen from among the many types available.

It follows, therefore, that a statement of the impedance of the valve should hold the most prominent place of all in the abbreviated description.

The next most important constant is the amplification factor, which serves to indicate which individual valve, among a number whose impedance is the same, will in practical use give the greatest amplification. The figure representing the amplification factor should therefore be given a place in the abbreviated description of the valve, but this place should be secondary to that held by the impedance.

Thirdly, the user, who will be in possession of either a 2, 4, or 6-volt accumulator, requires to know the filament voltage necessary to operate the valve, and this information also should be given; but, since the filament voltage has no great bearing upon the performance of the valve, it should not be given any prominent place in the description.

The filament current in these days of economical valves is of least importance except when dry batteries are used for the A supply.

Variometer Crystal Set.

A PETONE reader who constructed the variometer crystal set, described some time ago, states that with a one-valve amplifier he has received all New Zealand stations and four Australian, though reception is accompanied by fading. Considering that an ordinary clothes-line is being used as an aerial, this is good work. As stated in the article, the variometer is not selective, and was intended for local reception only, and this listener states that on some occasions he has heard several stations at the same time. The "R.R. Selective" is the best crystal circuit for long distance.

Notes on Reaction

EARLY Reinartz circuits gave reaction control that was very subject to hand-capacity effects that were not properly suppressed even by the use of metal panels.

Later modifications of the Reinartz circuit have done away with this difficulty by connecting the reaction coil direct to the plate of the valve, and interpo ing the reaction condenser between this coil and earth, so that provided the moving plates of the latter are joined to earth, a metal-lined panel can be used to remove any lingering traces of hand-capacity effects.

If this type of circuit, which is perhaps the most satisfactory of all, be adopted, it is found that the tuning can be made sufficiently independent of the reaction control to make adjustment of the receiver easy, though it is usual for the setting of the reaction condenser to vary widely over the different parts of the tuning range. This, however, is not found to make tuning difficult, and so is of but little practical importance.

It is found in practice that the greatest degree of independence between the controls is attained when the reaction condenser is not too small. It is therefore easier to handle a receiver in which the reaction coil is small, or loosely coupled to the tuned circuit, but is fed through a condenser of maximum capacity, perhaps 0.0003 mfd., than one in which the same degree of reaction is obtained by the use of quite a small condenser in conjunction with a large coil.

The remarks here made are equally applicable to receivers in which a stage of high-frequency amplification precedes the detector, even although in this case critical reaction should be required less frequently.

Coils and Condensers.

A HAPPY medium is the best in choosing a coil and variable condenser to work toget. in an R.F. circuit. The resistance of the coil varies considerably with the frequency, whilst that of the condenser remains nearly constant except at the lower end of the capacity scale. The resistance of the condenser is usually lower than that of the coil. By not making either the coil or condenser unduly large in proportion to the other, neither the voltage nor the resistance is at quite the best point, but the complete oscillatory circuit gives the best results.